

Docket No. 520.39294CX1  
Serial No. 10/642,654  
September 7, 2006  
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**REMARKS**

Withdrawal of the finality of the last Office Action and formal acceptance of the above amendments as a submission in connection with the U.S. PTO RCE practice is respectfully requested.

Reconsideration and allowance of the above-identified application, as currently amended, is also respectfully requested.

According to the outstanding Final Office Action, claims 1-2 and 5-6 stand rejected under 35 U.S.C. §103(a), allegedly, as being unpatentable over the combination of Yamazaki et al (U.S. Patent 5,933,205) in view of Hasegawa (U.S. Patent 5,064,779) and further in view of either Takahashi et al (U.S. Patent 5,712,496) or Ipri (U.S. Patent 4,597,160). As will be shown below, the invention according to these claims could not have been achievable even over the combined teachings of these references including in the manner alleged in the body of this rejection. Accordingly, this rejection is traversed and reconsideration and withdrawal of the same is respectfully requested.

Regarding the rejection of claims 3-4, Applicants would like to bring to the Examiner's attention that these claims were cancelled in the previously submitted amendment, which rendered moot, at that time, any previously standing rejection directed thereto.

The following represent two key featured aspects of the LCD device currently set forth in each of independent claims 1 and 5:

- (1) Each of the thin film transistors (TFTs) comprises a polycrystalline silicon semiconductor layer crystallized by laser annealing, and
- (2) Variations of positions of peaks of depth distributions of concentration of impurities introduced into the polycrystalline silicon semiconductor layer by

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implantation to determine a conductivity type thereof are within 10% of the thickness of the polycrystalline silicon semiconductor layer, the positions of the peaks being with respect to a surface of the substrate.

It is submitted, none of the applied references in the outstanding rejection disclosed or, for that matter, suggested the above-listed featured aspect (2). In fact, it is admitted in the rejection that Yamazaki et al does not teach this featured aspect. It is submitted, also, that even if one of ordinary skill would have attempted to apply the teachings of Yamazaki et al, Hasegawa, Takahashi et al, and Ipri, combinedly, the invention as currently defined in claims 1-2 and 5-6 could not have been achievable. In the rejection it is alleged that according to Hasegawa, the surface [of the polycrystalline silicon semiconductive layer] should be as smooth as possible, for example, less than 10 Å so as to enable the control of the doping depth. The Examiner's assertion notwithstanding, Applicants submit, however, that Hasegawa's manufacturing scheme of a polycrystalline silicon film does not support the structural aspects of the invention. Insofar as applicable to claims 1-2 and 5-6 of the invention, Hasegawa discloses only a technique for obtaining a smooth surface by controlling a power for plasma generation such as explained with regard to Hasegawa's disclosed example 1 (see from col. 6, line 65, to column 8, line 26). Incidentally, the assertion in the rejection related to "less than 10 Angstroms" could not be located in Hasegawa's specification. However, the following descriptive statement is present in Hasegawa: "the deposited silicon film has a very smooth surface, the surface roughness being 30 Å or less." (Col. 3, lines 48-50, in Hasegawa); see also Col. 7, lines 34-36, in Hasegawa.)

To reiterate, as noted above, Hasegawa discloses only a technique for obtaining a smooth surface through controlling a powerful plasma generation. In

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other words, since Hasegawa makes no mention of achieving crystallization by laser annealing, in contradistinction with that according to the present invention, one of ordinary skill in this area of technology would not have been motivated or led to apply Hasegawa's teachings to Yamazaki et al. Even if, *arguendo*, one of ordinary skill would have sought to combine the teachings of Hasegawa and Yamazaki et al, a LCD device according to claims 1-2 and 5-6 would still not have been achievable.

It is further alleged, in the rejection, that Hasegawa teaches enabling the controlling of the doping depth, using as a basis the description in col. 6, lines 30-49, of Hasegawa. It is submitted, however, such control of doping depth, according to Hasegawa, can only be realized in a case where there is adopted a combination of a special two-layer polycrystalline structure, consisting of a <100> film and a <110> film, and a thermal diffusion method. In accordance with the present invention, however, the impurities are introduced by implantation, which is different from that effected using a thermal diffusion method. Hasegawa, on the other hand, does not refer to the positions of peaks of depth distributions of concentration of impurities introduced into the polycrystalline silicon semiconductor layer by implantation to determine a conductivity type thereof and, moreover, Hasegawa makes no reference to the thickness of the polycrystalline silicon semiconductor layer. It is therefore apparent that Hasegawa also did not teach a percentage relation of the roughness amount to the thickness of the polycrystalline silicon film.

The present invention further calls for the variations of positions of depth distributions of concentration of impurities, which are introduced by implantation into the polycrystalline silicon semiconductor layer to determine a conductivity thereof, to be within 10% of the thickness thereof of the polycrystalline silicon semiconductor

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layer. Such, it is submitted, was neither taught nor could have been realizable in view of the combined teachings of Yamazaki et al and Hasegawa.

In fact, one of ordinary skill in this area of technology would not have been motivated to control variations of positions of peaks of depth distributions of concentrations of conductivity-type-determining impurities introduced into the polycrystalline semiconductive silicon layer by implantation to be within 10% of the thickness of the polycrystalline semiconductor layer, even when Yamazaki et al and Hasegawa are further considered in view of, also, the teachings of Takahasi et al and/or Ipri. As indicated earlier in his remarks, none of the four cited references in the rejection discloses the above-discussed featured aspect (2) of the invention according to both independent claims 1 and 5. In other words, the featured aspect which calls for defining variations of positions of peaks of depth distributions of concentration conductivity-type-determining impurities introduced into the polycrystalline silicon semiconductor layer by implantation to be within 10% of the thickness of the polycrystalline silicon semiconductor layer could not have been achieved even over the combined teachings of the four cited references, at least for the above-discussed reasons. It is submitted, for at least the above reasons, the invention according to independent claims 1 and 5 and also according to the dependent claims thereof, could not have been rendered obvious in the manner as that alleged in the rejection.

Therefore, in view of the above-made amendments, together with these accompanying remarks, withdrawal of the previously standing rejection as well as favorable action on the current pending claims, and an early formal notification of allowance of the above-identified application is respectfully requested.

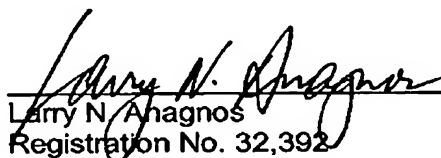
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If the Examiner deems that questions and/or issues still remain which would prevent the present application from being allowed at the present time, she is urgently invited to telephone the undersigned representative, at the number indicated below, so that either a telephone or personal interview may be arranged at the Examiner's convenience in order to discuss the same and hopefully resolve any remaining questions/issues present.

To the extent necessary, applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including Extension of Time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Dep. Acct. No. 01-2135 (520.39294CX1), and please credit any excess fees to such deposit account.

Respectfully submitted,

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